

Trait Variations for survival

Standard V:

Students will understand that traits are passed from the parent organisms to their offspring, and that sometimes the offspring may possess variations of these traits that may help or hinder survival in a given environment.

Objective 2:

Describe how some characteristics could give a species a survival advantage in a particular environment.

Intended Learning Outcomes:

1. Use Science Process and Thinking Skills

Content Connections:

Science V, Inherited Traits; Language Arts VIII-I, Organizing Information; Language Arts VIII-6, Write in different forms and genres

*Science
Standard*

V

Objective

2

Connections

Background Information

Members of a species are alike in many ways. However, individuals within a species show small differences. Variations are differences in appearance of an inherited trait among the members of a species. Variations can be observed in traits related to size, shape, behavior, function, and body parts. Most variations are minor and include differences in hair color, texture and length of fur, and flower color. Others may be major and quite apparent, like a cat with six toes on each paw or an albino deer. All of these variations are inherited and can be passed down to the offspring from the parent organism.

Variations in species may affect their ability to survive in a changing environment. During the course of many generations, a variation that provides a survival advantage can become widespread in a population because individuals with it have a higher probability of reproducing and surviving. If a species is unable to adapt to its changing environment, it can become extinct. Dinosaurs are an example of this.

Plant breeders take advantage of variations to produce improved crops. For example, United States potato farmers spend millions each year on pesticides, but insects become resistant to these pesticides. In Bolivia, a species of wild potato has hairs on its leaves that release a sticky chemical when touched. The hairs act like flypaper and trap pests that feed on the leaves of the potato plant. However, these potatoes are very small. Through plant breeding, scientists have been able to combine the trait of large size of the U.S. potatoes with the insect-resistance trait of the Bolivian potatoes to develop a high-yielding, large, insect-resistant variety of potatoes.

Research Basis

Lambert, M. & Carpenter, M., (2005). Visual learning: Using images to focus attention, evoke emotions, and enrich learning. *MultiMedia & Internet@Schools*, 12.5, pp. 20-24.

McCoy, J. D., & Ketterlin-Geller, R., (2004). Rethinking instructional delivery for diverse student populations: Serving all learners with concept-based instruction. *Intervention in School & Clinic*, 40.2, pp. 88-95.

Using graphic organizers can help students on all levels understand content concepts more clearly as they help the students organize the material. This can be especially true for students reading below grade level as the organizers can help them with reading comprehension. It is also helpful with gifted learners as it helps them bridge and categorize their expansive thinking.

Invitation to Learn

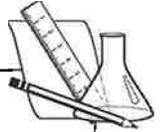
Show students a picture of a klipspringer antelope and a picture of a mountain goat. Ask them to think about the physical characteristics of each as you explain them to them. The information about these two antelopes is located on the *Mountain Goat and Klipspringer Animal Cards* overhead transparency. While both antelope live in the mountains on small ledges, the klipspringer has an amazing variation that allows it to leap from rock to rock without falling. Its rubbery hoofs allow it to grip the rocks as it jumps from one to another on the rocky slopes of the African mountains. The students will participate in an activity that will test their jumping ability.

Divide the students into pairs. Give each pair of students four square sheets of paper measuring 8" x 8", 6" x 6", 4" x 4", and 2" x 2". Lay the sheets of paper on the ground approximately one to one and one half feet apart from one another. One student at a time will try to jump from paper to paper without falling off any of them. This will help them make the connection that the klipspringer's hoof variation truly does help it survive in its environment and how important species variations are to the species' survival.

Instructional Procedures

Students will work in pairs to study related organisms that live in different environments. To teach the students how to do this activity, you will model it using the klipspringer and mountain goat.

1. Begin by passing out a copy of the *Klipspringer Card* to each student in the class. (Since you will also need a classroom set of the *Mountain Goat Card*, to save paper, you may want to copy the two animal cards front to back.)



2. Display an overhead transparency of the *Klipspringer Card*.
3. As a class, read the *Klipspringer Card* together. After each paragraph is read with students, pick out the word or words that convey the main idea of it. Have the students to write the word or words that give the main idea in the margin. Model this on the overhead as well. This strategy is called *Margin Magnets, as the words written in the margins are magnets that attract the information or what the paragraph was about. Follow this procedure for each paragraph on the card.
4. Fill out the overhead of the *Animal Variations Chart* together as a class using the information on the *Klipspringer Card*. You will be filling out the same chart on the overhead projector.
5. Repeat steps two through four using the *Mountain Goat Card*.
6. Fill out the *Venn Diagram for Comparing and Contrasting Animals* using the information written on the *Animal Variations Charts*.
7. Discuss the information on the two *Animals Variations Charts* noting how these variations give each organism a survival advantage in its unique environment.
8. Now you will write a class diamante poem using the information from the two *Animal Variations Charts* and the Venn Diagram. This diamante is a modified version to suit the purposes of this animal comparison study. The first three lines describe one of the animals, and the next lines describes both animals, and the last three lines describe the other animal. The format is as follows:

Line 1: Noun (one of the animals)

Line 2: Two adjectives describing first animal

Line 3: Phrase beginning with an "ing" word (participle) that describes what the noun does and where

Line 4: Three participles describing both animals

Line 5: Phrase beginning with an "ing" word (participle) that describes what the noun (other animal) does and where

Line 6: Two adjectives describing the other animal
Adjective, adjective

Line 7: Noun (the other animal)

Example:

Klipspringer
Spiky-horned, brown

Materials

- Paper squares 8" x 8", 6" x 6", 4" x 4", and 2" x 2"
- Klipspringer and Mountain Goat Animal Cards* (Overhead)
- Klipspringer and Mountain Goat Animal Cards*
- Animal Variations Chart* (2 Overheads)
- Venn Diagram for Comparing and Contrasting Animals*
- Venn Diagram for Comparing and Contrasting Animals* (Overhead)
- Animal Fact Cards* (small)

Landing on narrow, rocky mountain ledges in Africa
jumping, gripping, traveling
Rock climbing to dizzying mountain heights in Alaska
Bearded, white
Mountain Goat

9. The students will divide into pairs to study two different animals and will write their own poems.
10. Provide the student pairs with *Animal Fact Cards* that contain pictures and facts about related animals and birds living in different environments.
11. Now have students follow steps three through seven using new cards.
12. When they have written their own poems, have the students copy them onto the diamond outline and draw a picture of both animals to complete the assignment.

*The Margin Magnets reading strategy came from Dr. Carol Santa of the Montana Academy. She can be reached at carol@montanaacademy.com or to read more <http://www.projectcriss.com>

Assessment Suggestions

- The *Animal Variations Charts, Venn Diagram for Comparing and Contrasting Animals*, and both poems can be used as assessments.
- Students could write a paragraph or story detailing a situation in which their animal's variation would help it survive.

Curriculum Extensions/Adaptations/Integration

Instead of writing diamante poems, student pairs could write Poems for Two Voices and share them with the class. To write these poems, students are grouped in pairs. You can stipulate how many stanzas you want the poems to have. A stanza consists of three lines that do not need to rhyme. You could list the points from the lesson that you would like covered in the poems and they could include the information covered on their Animal Variations Charts. An example of a poem about klipspringers and mountain goats follows:

Animal Variations Poem for Two Voices Klipspringer and Mountain Goat

I am a klipspringer
I am a mountain goat
We are both antelopes

I live in Africa
I live in North America
We both live on mountain cliffs and ledges

I jump from rock to rock on small mountain ledges
I climb on rocks on the steep mountain slopes
We both have spongy, springy hoofs

I have a long brownish-gray bristly coat
I have a long, hairy white coat
Both of our coats protect us in our environments

I eat fruits, flowers, moss, and succulents
I eat grass, sedges, and lichens
We both have to search in treacherous circumstances for our food

I stay with one mate throughout my life
I live in herds of up to ten mountain goats
We both have one or two offspring a year

Students may choose to present the poems in a variety of ways including:

1. Having the first person read the first line, the second person reads the second line and both read the third line together.
or
2. Having both people read all three lines together.

If you choose to have your students follow choice number one, the pairs of students can write their poems on overhead transparencies using three different colors of markers; a separate color for each student and another for the line they read together. The students then present their poem to the class by displaying on the overhead projector and reading it together. You may want to have the students illustrate their poems with accurate drawings of the animals they researched.

- Group students with special needs with students who will have a good model to help them.

- Students who have a difficult time copying information from an overhead could be given a personal copy of the information to have at their desks so they do not have to look from the overhead to their paper in order to copy the information.

Family connections

- While visiting Hogle Zoo in Salt Lake City, read the information about the animals at each display.
- Find the animals at the zoo that you researched for your variations comparisons.

Additional Resources

Books

Macmillan Illustrated Animal Encyclopedia: A Visual "Who's Who" of all the World's Creatures, edited Dr. Phillip Whitfield, ISBN 0-02-627680-1

The Kingfisher Illustrated Animal Encyclopedia, David Burnie, ISBN 0-7534-5283-9

Videos

Eyewitness DK Survival; writer: Paul Thomas; director: Richard Simkin; 1997;
<http://www.dk.com>

Web sites

Source for animal card clipart:

<http://office.microsoft.com/clipart/default.aspx?lc=en-us> <http://jechevzy.free.fr/n.html>

More information about animals can be found at:

<http://www.animalsearch.net>

<http://www.awesomelibrazy.org/Classroom/Science/Animals/Animals.html>

<http://www.buschgardens.org/>

<http://classroomd-jpan.com/c-bin/kidslimagefolio.c;gi?direct=Animals>

<http://www.hoglezoo.org/>

http://www.nationalgeographic.com/kids/creature_feature/archive/

<http://www.projectwild.org/>

<http://yahooligans.yahoo.com/content/animals/>

<http://www.zoobooks.com>

Name _____

Animal Variations Chart

| | | |
|----------------|------------------------|---|
| Animal Name | Range (Where it lives) | Habitat |
| Size | Food Source | Outstanding physical features that allow this animal to survive in its environment. |
| Societal Group | | |



Venn Diagram for Comparing and Contrasting Animals

Name _____

_____ **Animal #1** _____ **Animal #2**

